

Mouse Monoclonal Antibodies for Liver Cancer Research

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Keywords: Therapeutic, Research Tool, diagnostic, hepatocellular carcinoma, HCC, Glypican-3, GPC3, antibody, monoclonal

Summary:

The National Cancer Institute [Laboratory of Molecular Biology](#) seeks parties for collaborative research to co-develop and commercialize antibody drug/toxin conjugates as liver cancer therapy and diagnostics.

Technology:

There is great interest and value in developing more sensitive and efficient agents for earlier detection of hepatocellular cancer (HCC). Glypican-3 (GPC3) is a cell surface heparin sulfate glycoprotein that is expressed on the vast majority of HCC cells. The correlation between GPC3 expression and HCC makes GPC3 an attractive candidate for studying the disease progression and treatment of HCC. The presence, progression, and treatment of HCC can potentially be monitored by tracking the level of GPC3 expression on cells. This can be accomplished using GPC3-specific monoclonal antibodies such as those NCI researchers generated for the cell surface domain of GPC3 (YP6, YP7, YP8, YP9 and YP9.1).

Potential Commercial Applications:

- Treatment of HCC as a stand-alone antibody , or as an antibody-drug conjugate (immunotoxin)
- Detection of cells that express GPC3 for monitoring HCC disease progression and treatment
- Immunostaining for tumor imaging, or ELISA and immunohistochemistry applications
- Other antibody-related research use, including immunoprecipitation, Western blot analysis, etc.

Competitive Advantages:

- Sub-nanomolar levels of binding affinity compared to commercially available GPC3 antibodies such as 1G12
- Able to bind to wild-type GPC3 better than the GPC3 core protein that lacks heparin sulfate

Development Stage: Pre-clinical, *in vitro* and *in vivo* animal data available

Patent Status: US Provisional Application No. 61/654,232 filed 01 Jun 2012.

Related technology: NIH Ref. # E-130-2011: U.S. Provisional application No. 61/477,020 filed 19 Apr 2011
PCT Application No. PCT/US2012/034186 filed 19 Apr 2012

Publications:

1. Phung Y, Gao W, Man YG, Nagata S, Ho M. High-affinity monoclonal antibodies to cell surface tumor antigen glypican-3 generated through a combination of peptide immunization and flow cytometry screening. *MABs*. 2012 Sep 1;4(5). [[PMID: 22820551](#)]
2. Ho M. Advances in liver cancer antibody therapies: a focus on glypican-3 and mesothelin. *BioDrugs*. 2011 Oct 1;25(5):275-284. [[PMID 21942912](#)]
3. Ho M, Kim H. Glypican-3: a new target for cancer immunotherapy. *Eur J Cancer*. 2011 Feb;47(3):333-338. [[PMID 21112773](#)]

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